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WP 29/2009/DE/SOCIUS

WORKING PAPERS

ISSN Nº 0874-4548

ROMAN LEGAL TRADITION AND THE MISMANAGEMENT OF HUNTING RESOURCES

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ABSTRACT

Hunting and game-preservation are interrelated: hunting must respect the intentions of game-preservation, and game-preservation must rely on hunting as one method to achieve its intentions.

HASENKAMP (1995) applied the Economic Theory of Common Resources to the problem to provide conclusions about the management and conservation of hunting resources. These conclusions are reflected in the existing relevant legal hunting setting in Germany. German Law contains legal principles that confronts the hunter with the objectives of hunting preservation and held him the responsibility for pursuing these goals.

In our paper, we derive a model of hunting management, adapting the GORDON/SCHAEFER fisheries model. The conclusions of the model, similar with those of Hasenkamp, are confronted with Portuguese hunting regulation.

We conclude that Portugal has a Roman legal tradition with respect to hunting property-rights. To the Roman conception, the wild animals constitute res nullius (things without owner) that all men can appropriate by *ocupatio*. The classification of free land implicates the idea that the hunter has the freedom of access to hunt in other's land, although respecting imposed norms. This tradition of open access is the root-cause of hunting depletion. But, at the same time, the legislator sees it as a form of giving the hunters without land, the possibility of enjoying this activity. This is compatible with the Portuguese tradition, which almost attributes a personality right to the right of hunting.

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INTRODUCTION

Whether for food or for sport, hunting marked all the periods of History, in all latitudes, cultures and civilisations (CARMO, 2000).
The traditional obscurity of hunting reflects in the relative poor attention given to these resources, in the context of the Natural Resource and Environmental Economics. Despite the social and economic importance of the sector in countries like Portugal, the literature on hunting is scarce.

HASENKAMP (1995) derives a model of hunting management and conservation and concludes that hunting and game-preservation are interrelated: hunting must respect the intentions of game-preservation, and game-preservation must rely on hunting as one method to achieve its intentions. The Economic Theory of Common Resources is applied to the problem to provide conclusions. What is curious is that these conclusions are reflected in the existing relevant legal hunting setting in Germany. That is, German Law contains legal principles that confronts the hunter with the objectives of hunting preservation and held him the responsibility for pursuing these goals.

In Portugal and other Latin countries, every year, when hunting season begins, "media" give visibility to the hunting debate. This debate always turn around the overexploitation of hunting resources and the dissatisfaction of hunters with hunting regulation, especially with that relates to hunting property-rights and access conditions to hunting grounds.

Our issues are the following: What are the differences between Portuguese regulation and the Germanic one? With respect to hunting regulation, is the legislator confronted with different conceptions or principles? What difference does it make? What are the economical effects of this possible distinct legal tradition?

The paper is made of 3 points:

- First, we discuss the concepts of property, commons and common property. In the literature on Natural Resources it would be difficult to find a concept as

misunderstood as commons. This situation of ambiguous concepts blur analytical and policy prescription clarity. We try to rectify this confusion and establish an adequate conceptualisation. A typology of property-rights regimes relevant to common property resources is presented.

- In the second point, we derive a simple model of hunting management and conservation. The analysis of the model leads us to conclude about the relation between the property-rights regimes and the efficient use of hunting resources.
- In the third point, we compare two conceptions of hunting property rights: the Roman conception and the German conception. An analysis of Portuguese history of hunting regulation takes us to conclude about our Roman tradition and hunting management consequences.

1 - ON COMMONS AND TRAGEDIES

"Therein the tragedy (…). Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all"

HARDIN (1968), Pg. 1244

In the literature on Natural Resources and Environmental Management, it would be difficult to find a concept as misunderstood as that of *commons* and *common property*, BROMLEY (1991).

The term is used to refer different situations, including:

- property owned by a government
- property owned by no one
- property owned and defended by a community of resource users
- any common-pool used by multiple individuals independently of the type of property rights involved (SCHLAGER and OSTROM, 1992).

This perpetuates the "unfortunate tradition" of failing to recognise the critical distinction between common property (res communes) and nonproperty/open access (res nullius).

The problem started five decades ago with the article of GORDON (1954), on fisheries, where he uses the term common property to describe the open access, and the confusion persisted in the papers of recognised authors in the Property Rights Theory. It was reinforced with HARDIN (1968) and its much-cited allegory of the "Tragedy of the Commons".

Some academics use the term common property and open access interchangeably. But we must recognise that ambiguous terms blur analytical and prescriptive clarity.
The current situation derives from the fact that none of the cited authors offer a coherent discussion of the meaning of rights, property, and property rights, before presenting the problems inherent in common property.
First, if we want to rectify the confusion, we must recognise that the term property refers not to an object or a natural resource but rather to the benefit stream that arises from the use of that object or resource. When economists think about property they are perhaps inclined to think of an object, and when they think about common property they accept the idea of common use of that object. This leads to the acceptance of the aphorism that "everybody property is nobody's property". The truth is that is only correct to say that "everybody's access is nobody's property".

Second, we must recognise that in the essence of the concept of property, there is a social relation. Property rights do not refer to relations between men and things but rather to the sanctioned behavioural relations among men that arise from the existence of things and pertain to their use (FURUBOTN and PEJOVICH, 1972). So, there is nothing inherent in the resource itself that determines absolutely the nature of the property rights. The property nature and the specification of resource use rights are determined by the society members and by the rules and conventions they choose and establish between them, about the use of the resources - not by the resource itself.
Rights are not relations between individuals and objects but rather relations between individuals with respect to objects' use (or the associated benefit stream). Rights can only exist when there is a social mechanism that gives duties and binds individuals to those duties. What we possess are the use rights and these rights are always circumscribed by

the prohibition of certain actions. What is possess are the rights of action socially recognised (ALCHIAN and DEMSETZ, 1973).

One solution to the impasse over the use of the term "common property" is to distinguish between the resource and the regime. This distinction between the resource itself and the property-rights' regime under which it is held, is critically important. In fact, the same resource can be used under more than one regime.

There are different proposals for this definition.
BROMLEY (1991) suggests 4 possible regimes in the case of natural resources. These regimes are defined by the structure of the rights and duties, which characterise the individual domains of choice:

- State property
- Private property
- Common property
- Nonproperty / Open Access

The state property is a regime where individuals have duties to observe about the resource use, face to the management agency, which has the right to determine the access/use rules.
In the case of private property, the individuals have the right to undertake the socially acceptable uses (and only those; which means they have the duty to conserve the resources) and to prevent the use from non-owners.
The common property is the case where the management group of "co-owners" has the right to exclude non-members and these have a duty to abide this exclusion. In this sense, the "co-owners" manage effectively the resource so they have also rights and duties with respect to the use and conservation of the resources.
In an open access regime, no defined group of users is set. The benefit stream from the resource is available to anyone. The individuals have, at the same time, the privilege of access and no duties with respect to resource use and conservation.

This definition leads to a clear distinction between the "true" common property (res communes) and the open access regime (res nullius). In the first case, the group of "co-owners" is well defined and a management regime for determining use rates has been established. In this sense, the common property reminds something like "a private property of a group of co-owners". Of course, the autonomy of decisions, especially in the case of transferability of rights, is much more limited than in the case of private property.

What is important to retain is that open access regime presupposes the non-existence of property-rights over the resources, perfectly defined and controlled. The "true" common property is defined by the impossibility of access by non-owners and the clear definition of use rights among members. This resource use regime has been successful in managing the resources over centuries, contrary to the idea of "the tragedy of the commons" (there are a lot of examples in the world; see BERKES, 1989).

Other proposals to distinguish the regimes are based in the well-known concepts of exclusion and rivalry (see RANDALL, 1983), or put the accent in the issue of transferability of rights (see GRIMA and BERKES, 1989).

The identification of the property regimes is not only a question of describing the attributes of the resource. It's also a matter of putting in evidence the institutional structure and the process of decision over resource use (see, also, SEABRIGHT, 1993). In this sense, the problems of common/res-communes resources are much more complex because they involve the contractual relations between the co-owners, but more solvable than the problems carried by open access, at least because of the permanent risk of new-entrants, in this last case.

We propose this typology:

Idealised types of property-rights regimes relevant to common property resources [1, 2]

Open Access ("res nullius")	Free-for-all; use rights are neither exclusive nor transferable; rights to access are common, but open access to everyone (therefore, no one property).
State Property ("res publica")	Ownership, management and control held by a government agency; public resources to which access rights have not been specified
Communal Property (res communes)	Resource use rights are controlled by an identifiable group of co-owners; there exist rules concerning access: who? Are excluded, and how? Should the resource be used and conserved; community-based resource management system; "true" common-property.

1) The fourth property-rights regime is private property.
2) Based on BERKES and FARVAR (1989)

2 - THE MODEL

To suit the purpose of modelling hunting activities and exploring the issues of hunting resources management and conservation, HASENKAMP (1995) adopted (and adapted) the model of DASGUPTA and HEAL (1979).

Our proposal is different. We adapt the GORDON/SCHAEFER model. Becoming from Fisheries Economics, this is a very useful model to explain the market characteristics and

agents behaviour, in the general common property case. Certain authors present this model, in their manuals on Natural Resource and Environmental Economics, as a general model for renewable resource management (see, for example, FAUCHEUX and NOEL, 1995).

The central point in the GORDON (1954) paper is that fish are difficult to observe (except upon capture), and mobile, often travelling great distances. Consequently, these resources have provided excellent examples of resources in which the costs of attempting to establish property rights were perceived as exceeding, by a wide margin, the benefits that might be derived there from. Gordon argues that, if a common property fishery is subject to no government regulation and the fishing industry is competitive, there will be inevitable market failure: the fishery will be expanded to the point that overfishing and overcapacity will occur (MUNRO, 1982). The similarities with the hunting case are obvious.

Suppose a large area, a municipality. We assume that the disposable land is subject to two different activities: agricultural use and hunting.
As in the Gordon model, if we want to design an acceptable economic model of hunting, we must introduce, in its foundation, a biological model of hunting resources growth.
In the Gordon article the underlying biological foundation is a variant of SCHAEFER (1957) model. The populations' dynamics can be easily described with a "Macro-biological Approach".
A hunting resource population or biomass will, if not subject to human capture, grow, in terms of weight, both as a consequence of recruitment of new individuals and as the result of the growth of individual wild animals in the population. Natural mortality will act as a check on growth. If we assume stable environmental conditions (especially, if we do not introduce men as predators), along the time, the biomass will approach a natural equilibrium level at which net growth is zero.
If we do not attempt to distinguish among the factors influencing net growth, the growth of the biomass can be viewed as a function of the biomass itself, and the population dynamics can be modelled by a very simple differential equation:

$$(1)\quad G(x) = \dot{x} = \frac{dx}{dt}$$

x denotes the biomass and G (x) represents the regeneration capacity associated with every level of the stock.

The relation between the rate of growth and the level of the stock is not monotonic. As in the Schaefer model, we'll have a quadratic function:

$$(2)\quad G(x) = r\,x\,(1 - x/K)$$

K denotes the carrying capacity and r, constant, denotes the intrinsic growth rate. When integrated, we are facing the popular *Lotka/Volterra logistic equation* of population dynamics.

When we introduce the men action of capture/hunting, the first equation is modified:

$$(3)\quad \dot{x} = G(x) - H(t)$$

H (t) denotes the hunting/capture rate.

The hunting production function is given by:

$$(4)\quad H(t) = h\,F(t)\,x(t)$$

where F(t) denotes the venation/hunting effort at time t (a kind of "capital-jelly" measure of the flow of labour and capital services devoted to capture activities; this could be evaluated, for example, in terms of hunting hours), and h, constant, denotes a capturability coefficient measuring the different capture conditions between hunting grounds.

If the resources are being captured in a sustainable basis, then $\dot{x} = 0$ and
H (t) = G(x). Hence, G(x) can be viewed as the sustainable yield associated with a given biomass level. This also drives us to the well known "Maximum Sustainable Yield" principle proposed by biologists as an orientation rule for resource use. The growth rate is a quadratic function. So, there is a stock where the regeneration capacity is maximised, and that is the stock which makes possible to maintain indefinitely a maximum capture rate. The management objective should be to drive the biomass to that level and, afterwards, to capture, every year, the associated growth of the stock.

Since H (t) is a function of F, as well as x, one can establish the sustainable yield/ venation effort relationship:

(5) $Y = \alpha F - \beta F^2$,

where Y denotes sustainable physical yield, with $\alpha = h K$ and $\beta = h^2 K/r$.
In fact, if capture is taking place on a sustainable basis we have $h F x = G(x)$.
and $h F x = r x (1-x/K)$. Then, we can derive the expression $x = K (1-h/r F)$ and, by substitution, we find an equation expressing sustainable yield as a function of F: $Y = h F K (1-h/r F) = h K F – (h^2K/r) F^2$

With the biological model complete, we can introduce prices and costs. As in the Gordon model, we assume that both the demand for captured hunting resources and the supply of hunting effort are perfectly elastic.

The cost function can be expressed as the simple equation:

(6) $C = c F$

We assume that the total cost is linear with effort. The constant c denotes unit cost of effort.

Sustainable revenue is represented by pY, where p is the price of hunting. It has, also, a quadratic form. Note that total cost is to be interpreted as the total cost of capturing the sustainable yield.

We can now solve the model and analyse the behaviour of the "industry".
The main conclusions are:
- If hunting was managed by a "sole owner", the hunting would be stabilised at the point where sustainable resource rent (sustainable revenue less total cost) is maximised, Fo. The hunting is managed in a socially optimal manner and, at that point, the marginal cost and the value of the marginal product of fishing effort are equal. If hunting effort expands beyond Fo, overexploitation of the resources occurs.
- If hunting activities take place in a regime of Open Access, that is, in a res nullius basis, and if hunting is unregulated and competitive, there is no landlord to appropriate the resource rents generated by hunting. Thus, if hunting was at the point where resource rents are maximised, Fo, the "industry" would be enjoying super-normal returns and new hunters would be attracted to enter the hunting ground. Hunting effort will expand, leading to overexploitation of biomass. In this case, hunting would not be in equilibrium until it had expanded to the point where total costs are equal to total revenues, that is, until resource rent had been fully dissipated. At this point, F∞, the marginal social cost is different from private marginal cost. This "bionomic equilibrium", as Gordon used to call it, reflects the existence of externalities in the capture process, and it's a case of market failure.

Note, also, that even the principle of "full resource utilisation", proposed by the biologists, is possibly less conservationist than it is pretended. In fact, the level of effort associated with maximum sustainable yield (FMSY) can be higher than the effort associated with the "economic optimum" (Fo).

The *central idea* can be stated as:
In conditions of free access and competition the market leads to non-optimal solutions in resource use. The "res nullius" nature of the property-rights regime and the presence of

externalities in the capture, and their effects, especially the complete dissipation of resource rents and the dynamic effects on the stocks, lead to market equilibrium solutions that implicate overexploitation and overcapacity.
There is nothing like an "invisible hand". Some kind of regulation is needed. Agents must internalise the external effects. Otherwise resources will be overexploited and, perhaps, irreversibly becoming extinct.

3 - THE ECONOMIC HISTORY OF HUNTING IN PORTUGAL: THE ROMAN LEGAL TRADITION AND THE MISMANAGEMENT OF THE RESOURCES

Ortega y Gasset formulated the hypothesis of being printed, in the man's sub-conscience, his hunter past.
The juridical evolution of the property-rights regimes of hunting and the discipline demanded for the activity can help to understand the attitudes of the legislator and the proposed regulation.
Hunting was the occupation more appreciated by man but, as the species tended for scarcity, the privatisation of this activity went progressively enlarged. The use of the resources was never an absolute right; it suffered prohibitions and limitations in all of the historical periods.

Along the centuries, two systems, or conceptions, about hunting property-rights, were confronted: the Roman conception and the Germanic conception.
The defenders of each one have been discussing the advantages of their approaches:
The Roman conception states that the wild animals constitute res nullius, things without owner that all men can appropriate by *ocupatio*, the only title of property acquisition on the hunt.
To this conception, the classification of *free land* implicates the idea that the hunter has the freedom of access to the hunt in other's land, although respecting imposed norms.

As the agriculture was organised, the idea of game reserve appeared. As a consequence, the other (twin) idea of extending an ownership right to the wild animals living in someone's land, was, also, developed. But, indifferent to such habits, the Roman Law started to consider freely, without property attribution, the whole wild animal. The property of the wild animal owes to the hunter who captured it; to the land proprietor, being just reserved the right of excluding others from hunting in their lands. It's the recognition of hunting res nullius nature and hunt as a national value.

This attitude is understandable: "Romans saw the activity in a circus perspective" (CARMO, 2000). This attitude made hunting a "frivolous" occupation, not an economic activity. Hunting was identified with the imperial virtues of physical and paramilitary education: "Hunting, horse-seated, was a distinctive form of the resistance to the barbarian activity of hunting as massacre" (CARMO, 2000).

This vision was incompatible with the private property. On the contrary, it suggested a noble fight between the man and the wild nature. And, only if nature was identified with something of absolutely free, this fight made sense in human and ethic terms.

The Germanic conception considers the right of hunting due to a privilege (feudal type) of the landlord. Hunting right is clearly linked to the property right on land. The landowner is entitled of disposing of what is "*his property*", including the hunt.

With the Barbarian invasions, it is possible that the German conception has been introduced in the Peninsula and that, in the feudal period, certain guidelines of the German right have been evidenced.

There has been an important debate among defenders of the two conceptions:

The defenders of the Roman regime oppose the argument that the Germanic conception is artificial in its foundations. It does not solve the management and conservation problem in the areas of small property - the hunt has natural mobility and can be born and feed in a hunting ground and live in another, and to be captured elsewhere. So, the determination of the property is impossible.

They also argue that, to be applied with the whole rigidity, this conception would result in the complete extinction of all the free lands, transforming the territory in an immense

game reserve where the hunters without land would not have access. This could be identified as a "true abuse of right". In the extreme situation, the "owner" could impede the access and could, also, destroy or take advantage of the resources, attempting against a public wealth that imported to safeguard. The State must limit such ends.

By the contrary, the Roman conception sees hunt as free, a common/res nullius good. The property right appears in the own moment of the capture. This conception has, to its favour, some arguments of value:
a) The mobility of the hunt inter-properties as a gift of the nature;
b) The private property carries out a social function and it can be the case that the Government wants the landowners to support the social costs of creating the species destined to collective use.

Be noticed, however, that the invocation of the Roman-Law was conceived with the end of removing another consequence: the possibility of anybody, if it has open access, to introduce in somebody else property and alienate, by capture, the wild animals.
But this is a mistake. "Res nullius" conceptualization, in these cases, doesn't stop having some limitations. In fact, (primary) it is not recognised to the landowners the right on the existent resources in their properties, but there has been (always) the possibility to exclude some hunters of entering in their fields to exercise the capture. This exclusion right doesn't refer to the resource, itself, but rather to access rules. The juridical regime of hunting, in this point, reflects the problems we've been highlighting: it seems that the legislator reduces the category of res nullius to the resource itself, forgetting that, in the centre of the property concept, there is a social relation.

The defenders of the German conception put in evidence the problem of the conservation of the species. The rationale of this argument approaches, in essence, the theoretical economic discussion we saw previously. The exploitation in regime of open access will lead, unavoidably, to the situation of overexploitation of the resources, due to the non-existence, or vague stance, of property rights.

On the contrary, the optimal solution can arise by trusting in the private owner interest. Landowners will use the resources in an inter-temporal logic that intends to maximise the present value of benefit stream of hunting, along the time. In their properties, each landlord can work as a "sole owner" (as the one in the model of Gordon) promoting the efficiency in the resource exploitation and conservation.

The Portuguese case is curious. Hunting was always practised in Portugal and covered by the Latin jurisprudence, although hunt resources have been considered as inherent to the land's domain. Our legislators wrapped up in this discussion. The confrontation between the defenders of these regimes impresses because it's a case of a country where the tradition of "the freedom of hunting" almost attributed *a personality right* to the right of hunting (CARMO (2000)).

Our tradition is, obviously, Roman, but it doesn't stop revealing interesting and original signs. After some original mixtures, with the approval of the *Civil Code of Seabra* (1868) the roman tradition is very clear. In the title III (of the territory occupation) and in the title I (article 383) hunting is designed as res nullius. The Code settles down the legal principle that "it is bid to all, without distinction, to hunt the wild animals, in conformity with the administrative regulations that determine the way and the time of hunting". The article 388 recognised the property-right to the hunter, after having captured the animal. The hunting regulation was complemented later with national and municipal regulations, and consisted of hunting seasons, prohibitions of destruction of nests and habitats, fines, and so on.

FINAL REMARKS

The final REMARKS of our research are the following:

- Despite the traditional "opacity" of hunting world, this is a fertile field for Social Sciences investigation, Economics included.

- There is an "unfortunate tradition" of failing to recognise the critical distinction between common property (res communes) and non-property (res nullius). This situation blurs analytical and prescriptive clarity. Property refers not to an object but rather to the benefits' stream that arises from its use. In the essence of property concept there is a social relation. So, there's nothing inherent in the resource itself that determines absolutely the nature of the property rights. The use of the term "Commons" is ambiguous.
- In conditions of open access and competition, the hunting market leads to non-optimal solutions in resource use. The "res nullius" nature of the property regime and the presence of externalities in the process of capture, lead to the complete dissipation of resource rents. So, the market will be driven to hunting equilibrium solutions that result in overexploitation of hunt resources and overcapacity ("the Tragedy of the Commons").
- Portugal has a long Roman tradition in legal hunting setting. The Roman conception intends that the wild animals constitute res nullius (things without owner) that all men can appropriate by *ocupatio,* the only title of acquisition of the property on the hunt. The classification of free land leads to the idea that the hunter has the freedom of access to the hunt in other's land, although respecting imposed norms. This tradition of open access is the root-cause of hunting depletion. But, at the same time, the legislator sees it as a form of giving the hunters without land the possibility of enjoying this activity. This is compatible with the Portuguese tradition, which almost attributes a *personality right* to the right of hunting.
- The actual Portuguese Hunting Law (1999) is a compromise between the Roman tradition and the necessity of hunting preservation. In the context of evident overexploitation of hunting resources, the legislator maintained the res nullius/open access principle in the municipal hunting zones and national hunting zones. At the same time, the legislation created associative and tourist hunting zones where the access rules are restricted, to held the hunters the responsibility to achieve the objectives of sustainable use and protection of the species. If we return to the idealised types of property-rights relevant to common property, it seems that we are now trying a perfect mixture of "res nullius", "res publica" and "res communes".

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